INTERFERENCE POTENTIAL OF ULTRAWIDEBAND SIGNALS

PART 3: MEASUREMENTS OF ULTRAWIDEBAND INTERFERENCE TO C-BAND SATELLITE DIGITAL TELEVISION RECEIVERS

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This report provides results from tests that measured digital television (DTV) susceptibility to ultrawideband (UWB) interference. A test system was developed to inject interference with known characteristics into a victim receiver and quantitatively measure susceptibility. In this experiment, a C-band satellite DTV victim receiver was injected with Dithered-Pulse (DP), Direct-Sequence (DS), and Multi-Band OFDM (MB) UWB interference. Results showed that the UWB signals could be categorized into three signal sets of common DTV susceptibility behavior. Interestingly, the categorized signals, band-limited by the DTV receiver filter, also had common characteristics. Set 1 consists of signals whose DTV susceptibility and band-limited signal characteristics resemble Gaussian noise. Set 2 consists of signals more deleterious than Gaussian noise interference. Notably, these signals had a wide range of band-limited signal characteristics and susceptibilities. Set 3 consists of a signal that is relatively benign. Results also showed that measurable band-limited characteristics, e.g., burst duration (*BD*), burst interval (*BI*), fractional on-time (ζ_{DTV}), and peak-to-average ratio (*P/A*), of the interfering signal are useful for predicting susceptibility. Finally, it was determined that continuous and gated noise signals can be used to emulate the interference effects of DS and MB signals for the DTV victim receiver and operational scenarios tested in this study. This might not be true, however, for testing the susceptibility of other victim receivers operating in narrower bandwidths as indicated by amplitude probability distributions as a function of frequency for MB signals band-limited to relatively narrow bandwidths.

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